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October 27, 2003

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RECEIVED

OCT 30 2003

MICHAEL S. GZBOWSKI

Re: S.N. 09/277,590
Title: ACRYLIC ELASTOMER COMPOSITION
Your Ref. : 121036-006
Our case : C-505

Dear Sirs,

Enclosed please find a letter to the EPO which was filed in a corresponding European Patent Application No. 99 105 142.6 of the present application.

The prior art used in the letter are as follows.

D1: USP 3,919,143

D2: JP-A-8-157679

D3: EP 0 811 659

The European Patent Application was patented on the ground that the application has the novelty and the inventive step (Patent Number 0 957 127).

Very truly yours,

Toshio Yoshida
Patent Attorney

Enclosed: letter to the EPO 6 sheets

The Examining Division is respectfully requested to reconsider the novelty of present Claims 1 and 10 in the light of the following arguments:

2.1 D1 corresponds to JP-A-50-123057, which is discussed in detail on page 1, lines 21 to 1 from the bottom and on page 7, line 16 to page 8, line 11 of the present application. It is, for instance, explained in detail in the cited parts of the present application that the person skilled in the art reading D1 and especially its examples would understand from this document that its authors intended to refer to the disodium or dipotassium salts of polyvalent carboxylic acids whenever they referred to these acids as such. The relevance of the use of the free acid instead of the alkali metal salts of the acid is discussed on page 1 of the present application. Accordingly, it is submitted that the use of the free acids has not been made available by D1.

2.2 The subject-matter of the present claims is furthermore submitted to be distinguished from the disclosure of D1 due to the fact that the latter document does not provide a direct and unambiguous teaching of the use of hydrotalcite. Whilst it is acknowledged that hydrotalcite may be considered as a "halide ion acceptor" according to D1, it is emphasized that hydrotalcite is a specific halide ion acceptor having specific properties and that the use of this specific halide ion acceptor has not been made available by the broad and generic disclosure of halide ion acceptors in Column 8, line 21 to Column 9, line 40 of D1. Moreover, none of the examples disclosed in D1 suggest or teach the use of hydrotalcite as the halide ion acceptor.

2.3 Finally, it is pointed out that the use of hydrotalcite does not correspond to an arbitrary selection of a specific halide ion acceptor, but that it is an essential feature for solving the objects of the present invention, as defined in the first paragraph on page 2 of the present application. The Examining Division is invited to compare the Inventive Example 4 of the present application with the Comparative Examples 1 – 4 of the present application, using CaO , Ca(OH)_2 , MgO and Mg(OH)_2 instead of hydrotalcite. It is to be noted that all of these halide ion acceptors are listed in Column 9, lines 22 – 24 of D1 as preferred halide ion acceptors. This comparison clearly shows that the use of hydrotalcite can be associated with

- excellent vulcanisation properties, especially in tc10 and tc90;
- excellent Mooney viscosity especially in scorch time; and
- remarkably improved compression set characteristics and heat aging resistant properties for both press vulcanisation products and post cured products.

None of these improvements can be derived from D1, which fails to describe the use of hydrotalcite and which does not even mention the generic family of compounds covering hydrotalcite, namely oxy compounds comprising two different non-alkali metals (cf. Column 9, lines 13 – 16).

In view of these considerations, it is submitted that D1 does not make available to the public the specific acrylic elastomer composition and the corresponding vulcanisation moulding product according to the present Claims 1 and 10. The novelty of these claims is therefore submitted to be established.

3. Inventive Step

The problem underlying the present invention is defined in the first paragraph of page 2 of the present application to be the provision of a halogen-containing acrylic elastomer composition, which is characterised by a combination of the following improvements: a reduced vulcanisation time, improved normal state physical properties and improved compression set characteristics, even without any secondary vulcanisation. This problem is solved by the unique combination of Features (A) to (D), which has not been made available to the public by any of the cited prior art references, as explained in the preceding section.

It is furthermore explained in the following paragraphs that the skilled person would not have arrived at the subject-matter of the present claims in view of the above problem when considering a combination of the cited prior art documents.

3.1 The present Claim 1 is distinguished from the technical teaching of D1 by the fact that the latter document does not disclose the use of hydrotalcite as a halide ion acceptor. Moreover, the skilled person is taught by the examples of D1 not to use a di- or polyvalent carboxylic acid, but to use its alkali metal salts instead. Finally, it is noted that the cure system according to Claim 1 of D1 comprises a quaternary ammonium salt or, alternatively, a monofunctional secondary or tertiary amine and that this latter alternative is not in accordance with the present invention. Thus, in order to arrive at the present invention, the skilled person would need to make a deliberate choice with respect to the ammonium salt rather than the amine, for which there seems to be no motivation from the examples of D1. In addition, the skilled person would need to use the free di- or polyvalent carboxylic acids instead of their alkali metal salts, which seems to be contrary to the teachings of the examples of D1. Finally, the skilled person would need to select hydrotalcite as the halide ion acceptor, for which there is no teaching or incentive whatsoever in D1.

3.2 D2 and D3 are two closely related documents originating from the same applicant. Both of these documents teach acrylic rubber compositions comprising a halogen-containing acrylic rubber, a triazine thiol crosslinking agent, a dithiocarbamic acid derivative and/or a thiuram sulfide, a hydrotalcite and/or an organotin compound and an aromatic carboxylic acid or an acid anhydride thereof. D3 furthermore teaches the use of a white filler and of a silane coupling agent.

3.3 It is noted that these documents teach a completely different cure system than the present invention (and D1), namely a combination of a triazine thiol compound and a dithiocarbamine acid derivative and/or thiuram sulfide compound instead of a quaternary onium salt. Moreover, it is pointed out that D2 and/or D3 teaches the use of an aromatic carboxylic acid compound or an acid anhydride thereof, but that this aromatic carboxylic acid does not necessarily need to be a di- or polyvalent carboxylic acid. It is furthermore emphasised that D2 and/or D3 teaches the alternative use of a hydrotalcite compound or an organotin compound. In order to arrive at the composition of the present invention, the skilled person would therefore need to use a different cure system that is not found or suggested in D2 and/or D3 and it would furthermore be necessary to make two deliberate choices with respect to the polyvalent carboxylic acid and with respect to hydrotalcite.

3.4 The purpose of D2 is specified to be the provision of "an acrylic rubber composition which shows excellent balance between storage stability and crosslinking velocity with reduced erosion and staining of the molds by formulating a specific crosslinking agent, a crosslinking accelerator, a metal erosion staining inhibitor and a crosslinking retarder". The section "constitution" furthermore indicates that the dithiocarbamic acid derivative and/or the thiuram sulfide acts as a crosslinking accelerator, which should therefore be indispensable if crosslinking velocity is to be improved. The specification of JP-A-8-157679 (which underlines D2) furthermore teaches that Component (D), which may be hydrotalcite, has a function to effectively suppress metal erosion and metal staining which occurs when the acrylic rubber composition is in contact with metal such as a mold. It may therefore be concluded that, according to D2, hydrotalcite has the function of a metal erosion and staining inhibitor, but that it is neither used to improve the crosslinking velocity, nor the compression set or other physical properties of the resulting rubber. The skilled person would therefore derive from D2 the information that it is essential to use a dithiocarbamic acid derivative and/or a thiuram sulfide if the crosslinking velocity is to be improved, but the skilled person would not derive any motivation from D2 to employ hydrotalcite in order to solve the problem underlying the present invention. This teaching clearly leads away from the present invention.

3.5 It is furthermore submitted that not even a combination of D1 with D3 would lead the skilled person to the subject-matter of the present invention, because there is no indication or motivation in either of these documents which would indicate to the skilled reader that hydrotalcite may contribute to the solution of the problem underlying the present invention *when used in combination with the cure system according to D1*. Moreover, there are various alternative combinations of features conceivable that are based on a combination of D1 and D3, which do *not* lead to the subject-matter of the present claims. For instance, the skilled person could use a monofunctional secondary or tertiary amine or even the cure system according to D3 (triazine thiol compound, dithiocarbamine acid derivative and/or thiuram sulfide compound) instead of the quaternary ammonium salt according to D1. Additionally, the skilled person could decide to choose an alternative halide ion acceptor according to D1 instead of hydrotalcite or, alternatively, the organotin compound according to D3. Finally, a similar choice is between the use of a di- or polyvalent carboxylic acid, its alkali metal salt (according to D1) or an aromatic carboxylic acid (which may as well be a monocarboxylic acid such as benzoic acid and salicylic acid) or its anhydride (according to D3). Thus, there are various combinations of the features of D1 and D3 conceivable, most of which do not lead to the subject-matter of the present invention. The technical teaching provided in D1 and D3 does not provide any incentive for the skilled person to select and combine the features of the present claims.

3.6 It is furthermore submitted that the present invention, as defined by the present claims, leads to a synergistic effect that can neither be derived from any of the cited prior art documents, nor from their combination. In order to prove this synergistic effect, the present applicant conducted additional comparative experiments. These experiments and the results observed in these experiments are described in an enclosure to this letter. These experiments and their results are interpreted as follows:

Sample A is in accordance with the present invention, except for the fact that hydrotalcite is absent. Sample B is identical with Sample A except for the fact that hydrotalcite is present. Sample C corresponds to Sample A except for the fact that the cure system according to the present invention has been replaced by that of D3 (notably the cure composition according to the Examples 1 – 3 of D3). Sample D corresponds to Sample C with the exception that hydrotalcite is present. This means, on the other hand, that Sample D corresponds to Sample C, with the exception of the cure system that is in accordance with D3 rather than the present invention.


It can be derived from the data in the enclosed table (comparison of columns for Samples C and D) that the addition of hydrotalcite to the cure system according to D3 does not lead to significantly improved vulcanisation characteristics. The same is true for the Mooney viscosity, the scorch time and the remaining physical properties. The addition of hydrotalcite to the cure system according to the present invention (comparison of Samples A and B), on the other hand, led to significantly improved vulcanisation characteristics. Moreover, Sample A, which did not contain hydrotalcite, resulted in extremely bad molding, so that it was not even possible to evaluate its physical properties. It is furthermore pointed out that the compression set determined for Sample B is significantly better than that observed for Samples C and/or D. These results demonstrate that there is a significant improvement in the vulcanisation characteristics and in the remaining physical properties (such as compression set) when using hydrotalcite in combination with the cure system according to the present invention. This improvement cannot be derived from any of the cited prior art references or from their combination.

In view of the above considerations, it is submitted that the subject-matter of the present claims is based on an inventive step with respect to the technical teaching of D1 – D3.

4. Concluding remarks

It is submitted that the present response deals effectively with each and every objection raised in the Official Action. A favourable reconsideration of the merits of the present application is therefore petitioned.

The scheduling of an oral hearing is requested in the alternative (as an auxiliary request) if the Examining Division should intend to refuse the present application without issuing another examination report.



Dr. Christiane Stein-Dräger
EUROPEAN PATENT ATTORNEY
Association No. 151

Encl.:

New pages 7, 9 and 16
Comparative test